realistic from the viewpoint of execution of its mass production as well. Consequently, its early-stage practical commercialization can be expected.

[0182] Also, by taking advantage of the silicon light-emitting diode according to the present invention, it becomes possible to provide a chip and a fabrication method of fabricating the chip. Here, on the above-described chip, devices, whose basic configuration element is a IV semiconductor and which emit light with a high efficiency, and light-receiving devices are integrated with a good yield on a substrate such as silicon.

[0183] Also, by taking advantage of devices which emit light with a high efficiency on a chip using silicon or the like, information transmission by light is implemented. This implementation allows implementation of an optical interconnection. Since light has no electric charge, light is capable of transmitting information without causing electric resistance to occur. This makes it possible to solve the serious problem in the conventional technologies, i.e., an increase in the electric resistance gives rise to an increase in power consumption.

[0184] Moreover, it becomes possible to provide a light-emitting field-effect transistor, whose basic configuration element is a IV semiconductor and whose light-emission intensity or light-emission wavelength is controllable with the gate voltage, and a fabrication method of fabricating the light-emitting field-effect transistor. The use of the light-emitting field-effect transistor allows the light-emission intensity or light-emission wavelength to be directly modulated with the gate voltage. Furthermore, by integrating the light-emitting field-effect transistors on a substrate such as silicon, it becomes possible to provide a logic circuit using light and a fabrication method of fabricating the logic circuit.

[0185] It should be further understood by those skilled in the art that although the foregoing description has been made on embodiments of the present invention, the invention is not limited thereto and various changes and modifications may be made without departing from the spirit of the invention and the scope of the appended claims.

1. A light-emitting device, comprising:
a first electrode for injecting an electron,
a second electrode for injecting a hole, and
a light-emitting unit electrically connected to said first electrode and said second electrode, wherein
said first electrode, said second electrode, and said light-emitting unit are composed of one and the same single-crystal material, said light-emitting unit being a thin film.

2. The light-emitting device according to claim **1**, wherein said thin film is a IV semiconductor.

3. The light-emitting device according to claim **1**, wherein said thin film is an indirect-transition semiconductor.

4. The light-emitting device according to claim **1**, wherein film thickness of said thin film is equal to 10 nm or less.

5. The light-emitting device according to claim **2**, wherein said IV semiconductor is silicon, and plane orientation of surface of said silicon is a (100) plane or a plane orientation equivalent to said (100) plane.

6. The light-emitting device according to claim **1**, wherein said IV semiconductor is germanium, and plane orientation of surface of said germanium is a (111) plane or a plane orientation equivalent to said (111) plane.

7. The light-emitting device according to claim **2**, wherein said light-emitting unit includes a p-type semiconductor region and an n-type semiconductor region,
difference between film thickness of said light-emitting unit in said p-type semiconductor region and film thickness of said light-emitting unit in said n-type semiconductor region is equal to 5 nm or less.

8. The light-emitting device according to claim **5**, wherein said surface is in contact with an insulating material.

9. The light-emitting device according to claim **8**, wherein said insulating material is silicon dioxide.

10. The light-emitting device according to claim **2**, wherein said light-emitting unit includes a p-type semiconductor region, an n-type semiconductor region, and an i-type semiconductor region formed between said p-type semiconductor region and said n-type semiconductor region,
film thickness of said i-type semiconductor region being thicker than film thickness of said p-type semiconductor region, and being thicker than film thickness of said n-type semiconductor region.

11. A light-emitting device, comprising:
a first electrode unit,
a second electrode unit, and
a light-emitting unit electrically connected to said first electrode unit and said second electrode unit, wherein
said light-emitting unit is composed of single-crystal silicon, said light-emitting unit having a first surface and a second surface opposed to said first surface,
plane orientation of each of said first and second surfaces being set to a (100) plane, thickness of said light-emitting unit in a direction orthogonal to said first and second surfaces being set at 10 nm or less.

12. The light-emitting device according to claim **11**, wherein said first and second surfaces are covered with an insulating material.

13. The light-emitting device according to claim **11**, wherein
said first electrode unit is composed of first-conduction-type single-crystal silicon, said second electrode unit is composed of second-conduction-type single-crystal silicon, said second conduction type being an inverse conduction type to said first conduction type,
said light-emitting unit including a first region of said first conduction type and a second region of said second conduction type, said first region being in contact with said first electrode unit, said second region being in contact with said second electrode unit.

14. The light-emitting device according to claim **13**, wherein said first region and said second region are in contact with each other.

15. The light-emitting device according to claim **13**, wherein said first region and said second region are in separation with each other.

16. A light-emitting device, comprising:
a first electrode unit for injecting an electron,
a second electrode unit for injecting a hole, and
a light-emitting unit electrically connected to said first electrode unit and said second electrode unit, wherein
said light-emitting unit is composed of single-crystal germanium, said light-emitting unit having a first surface and a second surface opposed to said first surface,
plane orientation of each of said first and second surfaces being set to a (111) plane, thickness of said light-emit-